CLAIMS

1. A recombinant, Gram-negative, bacterial cell having a periplasm and a cytoplasm, wherein the ratio of the periplasmic volume to the cytoplasmic volume is between about 0.5:1 and about 10:1, wherein the bacterial cell comprises an exogenous gene encoding a protein of interest.

2. The bacterial cell of claim 1, wherein the bacterium is selected from: *gammaproteobacteria* and *alphaproteobacteria*, optionally wherein the bacterium is selected from: *Escherichia coli*, *Vibrio natriegens*, *Pseudomonas fluorescens*, *Caulobacter crescentus*, *Agrobacterium tumefaciens*, and *Brevundimonas diminuta*, preferably wherein the bacterium is *Escherichia coli*.

3. The bacterial cell of any one of claims 1 or 2, wherein the ratio of the periplasmic volume to the cytoplasmic volume is between about 0.5:1 and about 5:1, or between about 0.5:1 and about 1:1, between about 1:1 and about 10:1, between about 1:1 and about 5:1, or between about 5:1 and about 10:1 .

4. The bacterial cell of any one of claims 1 to 3, wherein the bacterial cell is a coccus having a longest dimension of about 2 μm to about 16 μm, about 4 μm to about 16 μm, about 8 μm to about 16 μm, about 2 μm to about 8 μm, about 4 μm to about 8 μm, or about 2 μm to about 4 μm.

5. The bacterial cell of any one of claims 1 to 4, wherein the bacterial cell comprises an expression vector comprising an exogenous gene, optionally wherein the expression vector is free of a marker encoding for resistance to an inhibitor of bacterial cell peptidoglycan biogenesis.

6. The bacterial cell of any one of claims 1 to 5, wherein the exogenous gene is integrated into a chromosome of the bacterial cell.

7. The bacterial cell of any one of claims 1 to 6, wherein the bacterial cell comprises a coccus form of an amp^S and/or fosfomycin-sensitive bacillus strain, wherein the coccus form and the bacillus strain are genetically identical.

8. The bacterial cell of any one of claims 1 to 7, wherein expression of the exogenous gene is constitutive and/or inducible, optionally wherein the expression of the exogenous gene is inducible by an inducer selected from: isopropyl-β-d-1-thiogalactopyranoside, lactose, copper, and zinc.

9. The bacterial cell of any one of claims 1 to 8, wherein the bacterial cell further comprises a nucleic acid sequence encoding a signal peptide operably linked to the exogenous gene, wherein the signal peptide directs cotranslational export of the protein from the cytoplasm to the periplasm, optionally wherein the signal peptide is a periplasmic disulfide bond oxidoreductase, or preferably DsbA.

10. The bacterial cell of any one of claims 1 to 9, wherein the protein is a) collagen, optionally human collagen, b) artificial collagen, c) a therapeutic protein, optionally an antibody.

11. A cell culture comprising the bacterial cell of any one of claims 1 to 10 and a medium comprising a magnesium salt, wherein the concentration of magnesium ions in the medium is at least about 4 mM, optionally wherein the concentration of magnesium ions in the medium is between about 4 mM and about 20 mM, and/or about 10 mM, and optionally wherein the magnesium salt is selected from: magnesium sulfate and magnesium chloride.

12. The cell culture of claim 11, wherein the medium further comprises an osmotic stabilizer, optionally wherein the osmotic stabilizer is selected from: sugars and betaines, and/or wherein the concentration of the osmotic stabilizer in the medium is at least about 5%, about 5% to about 20% (w/v), or about 10% (w/v).

13. The cell culture of any one of claims 11 to 12, wherein the medium further comprises one or more ingredients selected from: ammonium chloride, ammonium sulfate, calcium chloride, casamino acids, iron(II) sulfate, magnesium sulfate, peptone, potassium phosphate, sodium chloride, sodium phosphate, and yeast extract**.**

14. The cell culture of any one of claims 11 to 13, wherein the medium comprises from about 1×10^8 bacterial cells per mL of culture volume to about 1×10^{10} bacterial cells per mL in a volume of at least about 1 L, or about 4×10^8 bacterial cells per mL of culture volume to about 1×10^9 bacterial cells per mL in a volume of at least about 1 L.

15. The cell culture of any one of claims 11 to 14, wherein the culture comprises at least one exogenous antibiotic inhibitor of bacterial cell peptidoglycan biogenesis.

16. The cell culture of claim 15, wherein the culture comprises at least two structurally distinct exogenous antibiotic inhibitors of bacterial cell peptidoglycan biogenesis.

17. The cell culture of claim 16, wherein the at least two structurally distinct exogenous antibiotic inhibitors of bacterial cell peptidoglycan biogenesis inhibit different components of a peptidoglycan biogenesis pathway in the bacterial cell.

18. The cell culture of any one of claims 11 to 17, wherein the culture medium comprises at least one reactive oxygen species (ROS) scavenger, optionally wherein the ROS scavenger in the medium comprises reduced glutathione.

19. A method of producing a protein of interest comprising:

    a) culturing a recombinant Gram-negative bacterial cell in a medium comprising a magnesium salt, wherein the concentration of magnesium ions in the medium is at least about 6 mM, and wherein the bacterial cell comprises an exogenous gene encoding the protein;

    b) inhibiting peptidoglycan biogenesis in the bacterial cell; and

    c) harvesting the protein from the medium.

20. The method of claim 15, wherein steps b) and c) occur sequentially, or wherein step c) is performed at least 1 hour after step b), or wherein steps b) and c) occur simultaneously.

21. The method of claim 19 or 20, wherein the bacterial cell changes shape from bacillus to coccus after inhibiting peptidoglycan biogenesis in the bacterial cell.

22. The method of claim 21, wherein the inhibiting peptidoglycan biogenesis in the bacterial cell comprises adding an antibiotic to the medium, wherein the antibiotic inhibits peptidoglycan biogenesis in the bacterial cell.

23. The method of claim 22, wherein the inhibiting peptidoglycan biogenesis in the bacterial cell comprises adding at least two structurally distinct antibiotics to the medium, and wherein the at least two structurally distinct antibiotics inhibit different components of a peptidoglycan biogenesis pathway in the bacterial cell.

24. The method of any one of claims 19 to 23, wherein the bacterium is selected from: *gammaproteobacteria* and *alphaproteobacteria*, optionally wherein the bacterium is selected

from: *Escherichia coli*, *Vibrio natriegens*, *Pseudomonas fluorescens*, *Caulobacter crescentus*, *Agrobacterium tumefaciens*, and *Brevundimonas diminuta*, preferably *Escherichia coli*.

25. The method of any one of claims 19 to 24, wherein the concentration of magnesium ions in the medium is between about 4 mM and about 20 mM, optionally about 10 mM and/or wherein the magnesium salt is selected from: magnesium sulfate and magnesium chloride.

26. The method of any one of claims 19 to 25, wherein the medium further comprises an osmotic stabilizer, optionally wherein the osmotic stabilizer is selected from: sugars and betaines preferably wherein the osmotic stabilizer is a sugar selected from: arabinose, glucose, and sucrose, or wherein the betaine is trimethylglycine.

27. The method of any one of claims 19 to 26, wherein the concentration of the osmotic stabilizer in the medium is at least about 5%, optionally about 5% to about 20% (w/v), preferably about 10% (w/v).

28. The method of any one of claims 19 to 27, wherein the medium further comprises one or more ingredients selected from: ammonium chloride, ammonium sulfate, calcium chloride, casamino acids, iron(II) sulfate, magnesium sulfate, peptone, potassium phosphate, sodium chloride, sodium phosphate, and yeast extract and/or an antibiotic selected from: β-lactam antibiotics, phosphonic acid antibiotics, polypeptide antibiotics, and glycopeptide antibiotics, wherein the antibiotic inhibits peptidoglycan biogenesis in the bacterial cell.

29. The method of claim 28, wherein the antibiotic is a β-lactam antibiotic selected from: penicllins, cephalosporins, carbapenems, and monobactams, or the antibiotic is selected from: alafosfalin, amoxicillin, ampicillin, aztreonam, bacitracin, carbenicillin, cefamandole, cefotaxime, cefsulodin, cephalothin, fosmidomycin, methicillin, nafcillin, oxacillin, penicillin g, penicillin v, fosfomycin, primaxin, and vancomycin.

30. The method of any one of claims 19 to 29, wherein the bacterial cell comprises an expression vector comprising an exogenous gene that encodes resistance to an antibiotic, wherein the antibiotic resistance is not an inhibitor of bacterial cell peptidoglycan biogenesis.

31. The method of claim 30, wherein the antibiotic that is not an inhibitor of bacterial cell peptidoglycan synthesis is an inhibitor of FtsZ polymerization.

32. The method of any one of claims 19 to 31, wherein the exogenous gene is integrated into a chromosome of the bacterial cell, and wherein the method further comprises inducing expression of the exogenous gene, optionally wherein the expression of the exogenous gene is inducible by an inducer selected from: isopropyl-β-d-1-thiogalactopyranoside, lactose, copper, and zinc.

33. The method of any one of claims 19 to 32, wherein the bacterial cell further comprises a nucleic acid sequence encoding a signal peptide operably linked to the exogenous gene, wherein the signal peptide directs cotranslational export of the protein from the cytoplasm to the periplasm, optionally wherein the signal peptide is a periplasmic disulfide bond oxidoreductase, preferably wherein the signal peptide is DsbA.

34. The method of any one of claims 19 to 33, wherein the protein is a) collagen, optionally human collagen, b) a therapeutic protein, optionally wherein the therapeutic protein is an antibody.

35. A protein prepared by the method of any one of claims 19 to 34.